Monterey Institute of International Studies
A Graduate School of Middlebury College

Graduate School of International Policy & Management

Course Syllabus - Fall 2013
IEPG 8670 - Energy and Environmental Markets

CF434, Monday/Wednesday, 2:00pm -4:00pm
Professor Gireesh Shrimali, PhD (gshrimali@miis.edu)
Office Hours: Wednesday 12:00pm-2:00pm (and by appointment)

COURSE DESCRIPTION

In the past 30 years, some of the largest industries have made the transition from a regulated to market-based paradigm. Managers in many transportation, information technology, and energy companies have had to devise strategies to cope with changes in economic regulations and the evolution of new markets and trading platforms. The energy industries feature a complex mix of regulation and market-driven incentives. As classic economic regulation of energy markets has been reduced, however, environmental concerns have increased and spawned a new set of regulations leading to new business challenges and opportunities.

Drawing on the tools of economics and finance, we study the business and public policy issues that these changes have raised in energy markets. Topics include the effects of competition, scarcity and seller market power on energy prices; the regulation and deregulation of energy markets; environmental impacts and policies related to energy production and use; the economics of alternative energy sources; the development and effect of organized spot, futures, and derivative markets in energy; antitrust and competition policy; and the transportation and storage of energy commodities. We examine the economic determinants of industry structure and evolution of competition among firms in these industries; investigate successful and unsuccessful strategies for entering new markets and competing in existing markets; and analyze the rationale for and effects of public policies in energy markets.

COURSE OBJECTIVES

- To introduce students to energy markets by examining the underlying economic principles.
- To demonstrate how antitrust and competition policy affects the functioning of energy markets.
- To introduce basic concepts in energy finance as related to the functioning of energy markets.
- To examine environmental impacts and economics of energy production and use.
- To understand how economics of alternative energy sources work differently from conventional ones.

COURSE PREREQUISITES

There are no re-requisites. However, it helps if you are familiar with economics and finance.

TEXTBOOKS AND OTHER MATERIALS

Readings: There are two optional textbooks.

- K. Viscusi, J. Harrington, and J. Vernon, Economics of Regulation and Antitrust, 4th edition, Cambridge, MA: MIT Press, 2005 (hereafter VHV).
- N. Keohane and S. Olmstead, Markets and the Environment, Washington, DC: Island Press, 2007 (hereafter KO).

Please complete readings for each meeting before the day on which the material will be covered. I will let you know beforehand which readings are required for each day.

Course Website: The course readings have been made available on EReserve. Any additional information will be posted on Moodle.

METHODOLOGY AND POLICIES

The class will start promptly at 6pm. Please arrive at least a couple of minutes before that so you are seated and ready to start on time. Arriving late not only means that you will miss some of the material; it will also disrupt the class and distract everyone else. Likewise, you are certainly allowed to go to the bathroom or get a drink of water when it is necessary, but keep in mind that walking in and out of class is distracting to the other students and to me. If you do find that you need to enter or leave during class, please open and close the door quietly. Class participation is a significant part of the learning process so please come prepared.

No Electronics Policy: This course will follow a "no electronics" policy. Use of laptop computers, cellphones, ipads, or other electronic devices during class will not be permitted. If you have a certified medical need to use a laptop in class, please come and talk to me about it.

ACADEMIC CONDUCT

All students will be held to all policies and procedures listed in the most current Policies and Standards Manual (PSM). This includes but is not limited to our Student Honor Code and regulations on plagiarism. A complete copy of the Policies and Standards Manual (PSM) can be found here: (http://www.miis.edu/media/view/23925/original/policy_and_standards_manual_update.pdf).

REQUIREMENTS AND GRADING

45%: quizzes. There will be three 45-60 minute-long quizzes with equal marks. The quizzes will be based on material covered since the previous quiz.

55%: project. The allocation would be:

- Project selection presentation: 10%
- Early findings presentation: 10%
- Mid-way findings presentation: 10%
- Final report/presentation: 70%

The project would involve writing a research-paper using economic analysis, and would contain the following components:

- Choosing an appropriate research topic based on relevance to energy economics and policy.

- Performing secondary research to identify existing literature addressing same/similar problems, and identifying gaps.
- Forming appropriate hypothesis for the problem at hand.
- Collecting data to perform analysis to support/reject hypothesis.
- Conducting analysis. (It could be wide-ranging – from simple number crunching to detailed statistical analysis.)
- Writing a <20 page (11-point text, line spacing 1.15 lines) report.

- Letter grades will be based on the following performance:

A	90-100%	(Excellent)
B	80-89%	(Good)
C	70-79%	(Satisfactory)
D	60-69%	(Poor)
F	0-59%	(Fail)

Grades will be awarded with plus and minus designations when the student's numerical score is in the very top or bottom end of the grade ranges described above. As noted in the Policies and Standards Manual (PSM), quality points are assigned as follows:

A and A+ 4.00 grade points per credit.
A- (minus) 3.67
B+ (plus) 3.33
B 3.00
B- 2.67
C+ 2.33
C 2.00
C- 1.67
D+ 1.33
D 1.00
D- 0.67
F (Fail) 0.00
P (Pass) Credit for course, no grade points.
NP (No Pass) No grade points or credit.
I (Incomplete) No grade points or credit.
W (Withdrawal with permission) No grade points or credit.
AU (Audit) No grade points or credit.
IP (In Progress) No grade points or credit.

There is no other system of grading or grading category at the Monterey Institute other than those listed above. Except for grades of "I' and "IP,"(***see sections 5.3 and 5.4 in Policies and Standards Manual***) all grades are considered final when reported by a faculty member at the end of a semester or marking period. A change of grade may be requested **only** when a calculation, clerical, administrative, or recording error is discovered in the original assignment of a course grade or when a decision is made by a faculty member to change the grade as a result of the disputed academic evaluation procedure (***see section 5.2 in Policies and Standard Manual***). Grade changes necessitated by a calculation, clerical, administrative, or recording error must be reported within a period of six months from the time the grade is awarded. **No grade may be changed as the result of a reevaluation of a student's work or the**

submission of supplemental work following the close of a semester or marking period. The Records Office shall only accept permissible changes of grade upon written approval of the faculty member's dean, who shall first verify that the Change of Grade request satisfies legitimate criteria.

SCHEDULE AND WEEKLY ASSIGNMENTS

1. August 26: Introduction to Course and Energy Overview (5 readings)
    - Council of Economic Advisors, Economic Report of the President, "Chapter 11: Recent Developments in Energy," 2006.
    - D. Rotman, "Natural Gas Changes the Energy Map," Technology Review, Nov/Dec 2009
    - S. Borenstein, "Cost, Conflict and Climate: U.S. Challenges in the World Oil Market"
    - J. Griffin and S. Puller, "A Primer on Electricity and the Economics of Deregulation" in Electricity Deregulation: Choices and Challenges, Griffin and Puller eds., Chicago: University of Chicago Press, 2005.
    - M. Mahoney, "Follow the Flow," Technology Review, May/June 2010.

2. August 28: Pricing, Scarcity and Market Efficiency (6)
    - S. Borenstein, "Understanding Competitive Pricing and Market Power in Wholesale Electricity Markets," Electricity Journal, July 2000, pp. 49-57.
    - R. Smith, "Electric Industry Capacity Glut Jolts Investors," Wall Street Journal, 11/11/03.
    - J. Mouawad, "A Fast-Growing Independent Strikes Gold in Oil Refining," New York Times, 5/18/05.
    - J. Mouawad, "Oil Refiners See Profits Sink as Consumption Falls," New York Times, 5/14/08.
    - D. Gilbert, "Refining Pinched on East Coast," Wall Street Journal, 9/28/11.
    - KO, Ch. 4, "The Efficiency of Markets"

3. September 4: Market Power in Energy Markets (3)
    - S. Borenstein, "The Trouble with Electricity Markets," Journal of Economic Perspectives, 2002, pp. 191-201.
    - S. Borenstein, J. Bushnell and M. Lewis, "Market Power in California's Gasoline Market," Center for the Study of Energy MarketsWorking Paper #132, University of California Energy Institute, May 2004, pp. 1-11.
    - Transcript of Reliant Traders during California Electricity Crisis.

4. September 9: The 2000-2001 California Electricity Crisis (2)
    - S. Borenstein, "The Trouble with Electricity Markets," Journal of Economic Perspectives, 2002, pp. 191-201.
    - R. Oppel Jr. and L. Bergman, "Deal for Use of Gas Pipeline Stirs Dispute on Competition," New York Times, 3/26/01.

5. September 11: Natural Resource Extraction and Pricing (2)
    - P. Pashigian, "Depletion of A Natural Resource," Price Theory and Applications, McGraw-Hill, 1995, pp. 606-619.
    - KO, Ch. 6, "Managing Stocks: Natural Resources as Capital Assets"

6. September 16: Project idea presentations – pitch 3 ideas, pick 1. Criteria:
    - Is it relevant in the current context?

    - Would it have policy relevance?
    - Would it use principles of economics?
- Is there data available?
- Can analysis be done?

7. September 18: First QUIZ /The Economic Role of Energy Storage (3)
    - T. Carlisle, "Asset Helps Keep Canada's EnCana Afloat," Wall Street Journal, 10/7/02.
    - J. Ball, "Unbridled Energy: Predicting Volatile Wind, Sun," Wall Street Journal, 10/2/09.
    - R. Smith, "Solar Plant to Generate Power After Sundown," Wall Street Journal, 12/31/10.

8. September 23: The Economic Role of Energy Transportation (5)
    - B. Levisohn, "Brent Out of Shape: How Oil Could Burn Investors," Wall Street Journal, 11/19/11.
    - C. Cummins, "Oil Jumps on Pipeline Deal," Wall Street Journal, 11/17/11.
    - Technology Review, Briefing: The Smart Grid, Jan/Feb 2011.
    - D.C. Johnston, "Grid Limitations Increase Prices for Electricity," New York Times, 12/13/06.
    - T. Aeppel, "Commodity-Freight Rates Slip as Global Growth Slows Down," Wall Street Journal, 6/13/05.

9. September 25: Commodity and Futures Exchanges (4)
    - U.S. Department of Energy, Energy Information Administration, "Derivatives and Risk Management in the Petroleum, Natural Gas, and Electricity Industries," October 2002, Section 2, pp. 3-14.
    - D. Strumpf, "New Oil Contract Weighed," Wall Street Journal, 12/8/11.
    - M. Sesit and D. Reilly, "Hot Money Helps Drive Oil Volatility," Wall Street Journal, 7/14/05.
    - J. Wilke and C. Cummins, "U.S. Accuses BP Of Manipulating Price of Propane," Wall Street Journal, 6/29/06.

10. September 30: Regulation of Natural Monopoly Markets (2)
    - VHV, Ch. 11, "Theory of Natural Monopoly," pp. 401-423.
    - VHV, Ch. 12, "Natural Monopoly Regulation," pp. 429-436.

11. October 2: Incentive Mechanisms in Regulation (3)
    - VHV, Ch. 12, "Natural Monopoly Regulation," pp. 436-447.
    - H. Demoro, "PUC Staff Says PG&E Should Pay for Diablo," San Francisco Chronicle, 5/15/87.
    - E. Herscher and D. Dietz, "Agreement Reached On Diablo Canyon Cost," San Francisco Chronicle, 6/28/88.

12. October 7: Introduction to Auctions / Project research design presentations (how would you do it?)
    - "Going, going, gone! A Survey of Auction Types," Agorics, Inc.

13. October 9: Regulation and Deregulation of Non-Monopoly Markets (3)
    - VHV, Ch. 18, "Economic Regulation of Energy." pp. 641-646, 671-685.
    - P. Wonacott, "Gas Lines and Growing Pains — China's Fuel Shortages Add to Pressure to End Central Planning," Wall Street Journal, 8/17/05.
    - L. Rohter, "Gas Smugglers Dodge the Law in Brazil and Venezuela," New York Times, 12/7/06.

14. October 16: Restructuring, Competition Policy, and Antitrust (4)

- S. Borenstein and J. Bushnell, “Electricity Restructuring: Deregulation or Reregulation?” Regulation, Vol. 23, No. 2, 2000.
- D. C. Johnston, “Competitive Era Fails to Shrink Electric Bills,” New York Times, 10/15/2006.
- J. Bushnell, “Looking for Trouble: Competition Policy in the U.S. Electricity Industry,” in Electricity Deregulation: Choices and Challenges, Griffin and Puller eds., Chicago: University of Chicago Press, 2005, pp. 256-271.
- J. Fialka, “Lawmakers Struggle to Define Gasoline Price ‘Gouging’,” Wall Street Journal, 11/9/05.

15. October 21: Second QUIZ / Mid-term review

16. October 23: Project early findings presentations (what have you found in early research?)
    - What are secondary research findings?
    - What was the early data gathering experience?
    - What hypothesis have you formed?
    - How are you planning to verify your hypothesis?

17. October 28: Vertical Structures and Business Models (7)
    - VHV, Ch. 8, “Vertical Mergers and Restrictions.”
    - L. Meckler, “Pump Games: Fill Up With Ethanol? One Obstacle Is Big Oil,” Wall Street Journal, 4/2/07.
    - I. Ordo˜nez and D. Gilbert, “ConocoPhillips to Split in Two,” Wall Street Journal, 7/15/11.
    - R. Dezember, “Shell Won’t Exit Refining,” Wall Street Journal, 9/22/11.
    - R. Gibson, “Gas Stations Fume Over Refiners’ Sales”, Wall Street Journal, 12/15/09.
    - S. Borenstein and J. Bushnell,” Retail Policies and Competition in the Gasoline Industry,” Center for the Study of Energy Markets Working Paper #144, University of California Energy Institute, May 2005, pp. 8-end.
    - C. Palmeri, “We’ll make it up on the volume,” Forbes, 2/22/99.

18. October 30: Long-Term Contracts (1)
    - S. Borenstein, “The Trouble with Electricity Markets,” Journal of Economic Perspectives, 2002, pp. 201-203.

19. November 4: Energy Externalities and Energy Security (4)
    - VHV, CH. 21, “Environmental Regulation”
    - National Research Council, Hidden Costs of Energy: Unpriced Consequences of Energy Production and Use, Summary, 2010.
    - K. Seelye, “Utility Buys Town It Choked, Lock, Stock and Blue Plume,” New York Times, 5/13/02.
    - KO, Ch. 5, “Market Failures in the Environmental Realm”

20. November 6: Taxes versus Tradable Permits in Pollution Control (2)
    - P. Portney, “Market-Based Approaches to Environmental Policy,” Resources, Summer 2003.
      I. Parry and B. Pizer, “Emissions Trading versus CO2 Taxes versus Standards,” Chapter 5 of Assessing U.S. Climate Policy Options, 2007, Resources For the Future: Washington D.C., pp. 80-86.

21. November 11: Tradable Pollution Permits in Practice (3)

- A.D. Ellerman and P. Joskow, "The European Union's Emissions Trading System in Perspective," Pew Center on Global Climate Change, May 2008.
- J. Bunge and C. Sweet, "U.S. Carbon Trading Centers on California," Wall Street Journal, 11/24/10.
- J. Spencer, "Why China Could Blame Its CO2 on West," Wall Street Journal, 11/12/07.

22. November 13: Third QUIZ / Hybrid Environmental Regulation (1)
    - J. Bushnell, C. Peterman, C.Wolfram, "Local Solutions to Global Problems: Policy Choice and Regulatory Jurisdiction," National Bureau of Economic Research Working Paper #13472, October 2007. [W]

23. November 18: Project mid-way status presentations (what are mid-way findings?)
    - Complete secondary research findings
    - Data availability and gathering
    - Preliminary analysis and hypothesis verfication

24. November 20: Environmental Standards and Information Policies (2)
    - L. Meckler and K. Lundegaard, "New Fuel-Economy Rules Help the Biggest Truck Makers," Wall Street Journal, 8/24/05.
    - J. Fialka and K. Kranhold, "Lights Out for Old Bulbs? — U.S. Plans a Switch to All Fluorescents for Efficiency's Sake," Wall Street Journal, 9/13/07.

25. November 25: Energy Efficiency (2)
    - K. Gillingham, R. Newell, and K. Palmer, "Energy Efficiency Economics and Policies," Annual Review of Resource Economics, 2009, Vol. 1, pp. 597-619.
    - D. Owen, "The Efficiency Dilemma," The New Yorker, 12/20/10.

26. December 2: Alternative Energy Investments and Policies (9)
    - S. Borenstein, "The Private and Public Economics of Renewable Electricity Generation," Energy Institute at Haas Working Paper #221R, December 2011.
    - S. Mufson, "The Race to Rule the Sun," Washington Post, 12/18/11.
    - Y. Chernova, "Loan Was Solyndra's Undoing," Wall Street Journal, 9/16/11.
    - P. Krugman, "Green Economics: How We Can Afford to Tackle Climate Change," New York Times, 4/11/10.
    - J. Rather, "Is the Answer Blowing in the Wind?," New York Times, 11/5/06.
    - L. Etter, "Ethanol Craze Cools As Doubts Multiply — Claims for Environment, Energy Use Draw Fire," Wall Street Journal, 11/28/07.
    - L. Denning, "Solar Market is Risking Sunstroke," Wall Street Journal, 12/11/10.
    - M. Wald, "Giant Holes in the Ground," Technology Review, November/December 2010.
    - M. L. Wald, "Making Renewables Reliable," New York Times, 11/19/09.

27. December 4: Innovation Policies and Incentives (4)
    - R. Buckman and J. Carlton, "Seeking the Green in Clean — Tech-Focused Venture Capitalists
    - Plunge Into Risky Field of Alternative Energy," Wall Street Journal, 12/3/07.
    - J. Gertner, "Capitalism to the Rescue," New York Times, 10/05/08.
    - E. Hintz, "Creative Financing: The Rise of Cash Prizes for Innovation..." Wall Street Journal, 9/27/10.

28. December 9: Business Planning and Cost-Benefit Analysis / Course Wrap up (2)
    - S. Borenstein, "The Market Value and Cost of Solar Photovoltaic Electricity Production," Center for the Study of Energy MarketsWorking Paper #176, University of California Energy Institute, January 2008.
    - M. Ramsey, "As Electric Vehicles Arrive, Firms See Payback in Trucks," Wall Street Journal, 9/8/10.

29. December 11: Project final presentations

EXAM AND ASSIGNMENT SCHEDULE

Exams

- September 18: 1st in-class quiz
- October 21: 2nd in-class quiz
- November 18: 3rd in-class quiz

Project

- September 16: Project idea presentations
- October 7: Project research design presentations
- October 23: Project early findings presentations
- November 20: Project mid-way status presentations
- December 11: Project final presentations